

Instituto de Ciência e Engenharia de Materiais e Superfícies (Lisboa) - ICEMS [84]

[Página principal > Relatório científico 2004]

Lacrado em 30-03-2005 10:35:00

Indicadores de execução relativos a 2004 - Projecto Global**Indicadores de execução 2004**

	Previsto	Realizado
A - Publicações		
Livros	4	19
Artigos em revistas internacionais	78	83
Artigos em revistas nacionais	7	8
B - Comunicações		
Em congressos científicos internacionais	74	97
Em congressos científicos nacionais	30	33
C - Relatórios		
D - Organização de seminários e conferências	0	17
E - Formação Avançada	3	19
Teses de Doutoramento	6	5
Teses de Mestrado	5	7
Outra	0	1
F - Ferramentas		
G - Aplicações computacionais	4	0
H - Instalações Piloto	3	0
I - Protótipos laboratoriais	0	0
J - Patentes	4	0
	1	1

Relatório científico por sub-projecto

Sub-projecto	Investigador responsável
Sub-project	Sub-project leader
MATECHEMPRO	Maria Norberta Neves Correia Pinho
5Mat	Luís Manuel Guerra Silva Rosa
PRECHAMAT	Rui Mario Correia Silva Vilar
Total: 3	

Data: quarta-feira, 30 de Março de 2005


 (assinatura do Responsável pelo Projecto)

30-03-2005 - 15:40

UNião Europeia - Fundos Estruturais

Governo da República Portuguesa

 Ciência, Inovação
 2010

 Programa Operacional Ciência e Inovação 2010

SECRETARIA DE CIÊNCIA, INOVAÇÃO E ENSINO SUPERIOR


Instituto de Ciência e Engenharia de Materiais e Superfícies (Lisboa) - ICEMS [84]

[Página principal > Relatório científico 2004]

Sub-projecto**Sub-project**

Structural Materials: processing, analysis and modelling

Investigador responsável**Project leader**

Luís Manuel Guerra Silva Rosa

Resumo da actividade desenvolvida

According to the proposed tasks, the research work developed during 2004 focussed on the following:

1. Cellular materials: Liquid foams (energy and instabilities of 2D clusters; effect of Plateau borders on equilibrium of 2D and 3D foams); Solid foams (evaluation of cork quality and characterization (structural and mechanical) of hybrid aerogel foams).
2. Multiphase polymeric systems and biopolymers: photo-polymerization of dental adhesives (relative concentrations of major components obtained by ^1H NMR; influence of temperature and duration of air-drying period followed by gravimetric analysis, by ^1H solid-state NMR spectroscopy and stray-field MRI; evolution of proton magnetization with irradiation time and intensity, recorded and correlated with volumetric polymerization shrinkage and extent of reaction; local mobility changes discriminated with a pixel resolution of tens of micron; in situ follow-up of photo-polymerization of dimethacrylate monomers, under different irradiating conditions, by ^1H stray-field magnetic resonance imaging; evolution of proton magnetization with irradiation time and intensity recorded and correlated with volumetric polymerization shrinkage, extent of reaction and spatially-resolved reaction rates; ongoing modeling on light interaction with dimethacrylate monomers); Studies on relevant commercial glass-ionomers used in Dentistry and research on novel borosilicate glasses and glass-ceramics (correlation of compressive strength with B and Al speciation, relative concentrations of 4-/3-coordinated boron and 4-/6-coordinated aluminium obtained from multinuclear magnetic resonance studies); Solid State ^{13}C -NMR studies on Crystalline Structure of Isotropic and Oriented Polyamide 6 and Polyamide-12, which, in combination with Synchrotron WAXS and SAXS observations, provided information about resulting changes in fine crystalline structure following processing of these semi-crystalline polymers; Rheological characterization of nanocomposites produced from hydrocalcite and polyolefins (polyethylene and polypropylene); Assessment of recyclability and re-use of poly-vinylbutyrol from laminated safety glass; Determination of changes induced by shear flows in rheological material functions of triblock copolymers.
3. Mechanical behaviour of ceramic materials: Ornamental stones/natural ceramics (microstructure and mechanical properties, dynamic test methodologies for assessing elastic constants; characterisation of diamond tools (wear behaviour and mechanical properties); study of new stone processing technologies using high-performance diamond tools; optimisation of polishing processes and investigating the use of new inspection techniques for assessing stone surface quality and study of new diamond tools for polishing stones); Ceramic and carbon-carbon composites (validation of test procedures and assessment of factors affecting measurements, namely of test methods for characterising reinforcements (multifilament tows consisting of small-diameter SiC, Al₂O₃ and carbon fibres) and test methods to determine the fiber/matrix interfacial frictional shear stress (using minicomposites); evaluation of damage in composites through cyclic tensile tests; development of statistical models for the distribution of strength data); Ceramic materials processing by solar furnace (manuscript entitled "Solar sintering of cordierite-based ceramics at low temperatures" submitted to Solar Energy Journal, available online (www.sciencedirect.com)); research proposal entitled "Carbide synthesis of d-group transition metals and further studies on ceramics using the solar spectral radiation" submitted for granting access to SOLFACE facilities at PROMES-CNRS, Odello, France, www.promes.cnrs.fr/solface.)
4. Fatigue of materials and composite materials: Cyclic plasticity and fatigue behaviour of metallic materials under dynamic multiaxial loading (new experiments of low cycle fatigue tests under various biaxial tension and torsion loading paths for three structural steels; effects of biaxial loading paths on fatigue lives and crack growth orientations; simulation of elasto-plastic behaviour of these materials using finite element technique and numerical results compared with experimental results; improved parameters for multiaxial fatigue life prediction proposed; fractographic results); Fatigue crack growth of carbon steels under variable amplitude loading with special emphasis on the study of crack closure influence on fatigue crack growth (new testing methodology concerning the study of fatigue crack growth and crack closure under vacuum conditions, in order to eliminate oxide induced crack closure); Bending behaviour of reinforced sandwich beams, with foam core (testing and finite element analysis; different reinforcements tested; different non-linear theories applied to model bending behaviour of reinforced sandwich beams); Laminated composite materials (study of mixed mode fracture analysis of laminated composite materials; new testing apparatus; preliminary tests concerning mode I/mode II fracture; analytical and numerical studies concerning partition of mode I/mode II fracture during testing).
5. Fatigue and fracture of engineering materials: research projects financed by the EU under the ECSC programme, by RTO/NATO and by FCT and Portuguese Institutions ("Surface integrity for fatigue life extension", RTO/NATO, P.131; "Improving the fatigue performance of welded stainless steels", EU ECSC Programme, 7210 - PR301/F3; "Fatigue design of exhaust conducts of naval gas turbines", Portuguese Navy, ICEMS/UME; "Fatigue and creep behaviour of powder metallurgy nickel base superalloys", FCT, POCTI/EME/46195/02) in progress.

Indicadores de execução 2004**A - Publicações**

Livros

Previsto**Realizado**

2

8

Artigos em revistas internacionais

18

24

Artigos em revistas nacionais

2

2

B - Comunicações

Em congressos científicos internacionais

25

36

Em congressos científicos nacionais

20

15

C - Relatórios

0

7

D - Organização de seminários e conferências

1

7

E - Formação Avançada

Teses de Doutoramento

2

3

Teses de Mestrado

2

2

Outra	0	0
F - Modelos	0	0
G - Aplicações computacionais	0	0
H - Instalações Piloto	0	0
I - Protótipos laboratoriais	0	0
J - Patentes	0	0

Publicações em 2004**A - Publications**

- Books and chapters of books

Guerra Rosa, L, "Diamond Tool Characterisation Methodologies: New Perspectives for Stone Processing", Chapter 5 in Application of Diamond Technology in the Stone Sector, OSNET Editions, Volume 4, EUR 20637 / 4, edited by S. Carosio and I. Paspaliaris, pp. 45-63, 2004.

Pinto, Sérgio, Pozo, D, Amaral, PM, "New perspectives in the use of diamond tools for polishing stones", Chapter 4 in Complementary Technologies for Stone Processing, OSNET Editions, Volume 9, EUR 20637 / 9, edited by S. Midha and I. Paspaliaris, pp. 43-61, 2004.

Fortes, M. A., Rosa, M. Emília and Pereira, Helena, "A Cortiça". Lisboa: IST Press, 2004 (ISBN 972-8469-33-0).

Arlindo Silva, Carlos Tavares Ribeiro, João Dias, e Luis Sousa, "Desenho Técnico Moderno", LIDEL Edições Técnicas, 4th Ed, Setembro 2004.

Diogo, A.C., Baptista, E., Chainho, I., Velasco, J.I., "Rheological and dynamic mechanical behaviour of polyolefin nanocomposites containing hydrocalcite: preliminary results", in Series on Advances in Experimental Mechanics, vol. 9 (ed. I.Emri), SEM-Center for Time dependent Materials, Ljubljana, 453-511, 2004.

Costa, A., Piteira, F., Diogo, A.C., Sousa, I., "Glass transition in traditional cookies with different fibres" in Progress in Rheology of Biological and Synthetic Polymer Systems (ed. A.C. Diogo, N.B. Alvarenga, J. Canada, S.F. Palma and J. Dias), Instituto Politécnico de Beja, 283-89, 2004.

Diogo, A.C., "Modification of the viscoelastic material functions of triblock copolymers induced by pre-shear", in Progress in Rheology of Biological and Synthetic Polymer Systems (ed. A.C. Diogo, N.B. Alvarenga, J. Canada, S.F. Palma and J. Dias), Instituto Politécnico de Beja, 409-14, 2004.

Branco, C.M., Infante, V., Sousa e Brito, A., Martins, R.F., "A failure analysis study of wet liners in maritime Diesel engines", publish in book, "Failure Analysis", Case Studies, III, Elsevier Publishers, pp. 439-457, July 2004.

- Papers in international journals

Guerra Rosa, L, Amaral, PM, Anjinho, C, Fernandes JC, "Evaluation of Diamond Tool Behaviour for Cutting Stone Materials", Industrial Diamond Review, Issue 1, pp. 45-50, 2004.

Amaral, PM, Guerra Rosa, L, Pinto, S, Pozo, D, "New line of diamond tools raises productivity in polishing stone", Industrial Diamond Review, Issue 3, pp. 33-37, 2004.

Guerra Rosa, L, Figueiredo I, Anjinho, CA, "Statistical Evaluation of the adequacy of a Mixture of Two Weibull Distributions to model Strength and Fracture-Strain of Carbon Fibres", Mater Sci Forum, Vols. 455-456, pp. 676-680, 2004.

Matos, MJ, Vaz, MF, Fernandes, JC, Oliveira, FAC, "Structure of cellular cordierite foams", Mater Sci Forum, Vols. 455-456, pp. 163-167, 2004.

Oliveira, FAC, Dias, S, Vaz, MF, Fernandes, JC, "Crushing behaviour of cellular cordierite foams", Mater Sci Forum, Vols. 455-456, pp. 176, 2004.

Fortes, M. A., Rosa, M. Emília, Vaz, M. Fátima and Teixeira, P.I.C., "Mechanical instabilities of bubble clusters between parallel walls", European Physical Journal E, 15, 395-406, 2004.

Vaz, M. Fátima, Cox, S. J. and Alonso, M. D., "Minimum energy configurations of small bidisperse bubble clusters", Journal of Physics: Condensed Matter, 16, 1-11, 2004.

Matos, M. J., Vaz, M. Fátima, Fernandes, J. Cruz and Oliveira, F. A., "Structure of cellular cordierite foams", Materials Science Forum, 455-456, 163-167, 2004.

Oliveira, F. A., Dias, S., Vaz, M. Fátima and Fernandes, J. Cruz, "Crushing behaviour of cellular cordierite foams", Materials Science Forum, 455-456, 172-176, 2004.

Rosa, M. Emília, Osório, J., Green, Vicky and Fortes, M. A., "Torsion of cork under compression", Materials Science Forum, 455-456, 235-238, 2004.

Fortes, M. A., Rosa, M. Emília and Afonso, L., "Tensile testing and dislocation glide in liquid foams", Materials Science Forum, 455-456, 644-647, 2004.

Fortes, M. A. and Deus, A. M., "Effects of triple grain junctions on equilibrium boundary angles and grain growth kinetics", Materials Science Forum, 455-456, 648-651, 2004.

Vaz, M. Fátima and Fortes, M. A., "Minimum surface energy of self-assembled two-dimensional cells of equal area", Materials Science Forum, 455-456, 671-675, 2004.

Romeiro, F, Freitas, M and Pommier, S, "Effects of overloads and undeloads on fatigue crack growth and interaction effects", Journal of ASTM International, Vol. 1, nº 9, 2004.

Reis, L, Li, B. and Freitas, M., "Biaxial fatigue for proportional and non-proportional loading paths", Fatigue and Fracture of Engineering

Materials and Structures, 27, 775-784, 2004.

Reis, L., Fonseca, A. and Freitas, M., "Methodology for fatigue life assessment of the structural integrity of fighter aircraft", Fatigue and Fracture of Engineering Materials and Structures, 27, 873-877, 2004.

Pires, Ricardo, Nunes, Teresa G., Abrahams, Isaac, Hawkes, Geoffrey E., Morais, Cláudia, Fernandez, Christian, "Stray-Field Imaging and Multinuclear Magnetic Resonance Spectroscopy Studies on the Setting of a Commercial Glass-Ionomer Cement", J. Materials Science: Materials in Medicine, 15(3), 201-208, 2004.

Pires, R.A., Abrahams, I., Nunes, Teresa G., Hawkes, G.E., "31P nuclear magnetic resonance and X-ray diffraction studies of Na-Sr-phosphate glass-ceramics", Key Engineering Materials, Vols. 254-256, 95-98, 2004.

Pires, Ricardo, Abrahams, Isaac, Nunes, Teresa G., Hawkes, Geoffrey E., "Non-Random Cation Distribution in Sodium-Strontium-Phosphate Glasses", J. of Non-Crystalline Materials, 337, 1-8, 2004.

Guillot, G., Nunes, Teresa G., Ruaud, J. P., Polido, M., "Aspects of the Photopolymerization of a Commercial Dental resin Studied by 1H Magnetic Resonance Imaging", Polymer, 45, 5525-5532, 2004.

Smith, P., Derby, B., Reis, N., Wallwork, A., and Ainsley, C., "Measured anisotropy of alumina components produced by direct ink-jet printing.", Key Engineering Materials, 264-268: 693-696 Part 1-3, 2004.

Branco, C.M., Infante, V., Baptista, R., "Fatigue behaviour of welded joints repaired by hammer peening", Fatigue and Fracture of Engineering Materials and Structures, 9, August 2004.

Martins, R.F., Branco, C.M., "A fatigue and creep study in austenitic stainless steel 316L used in exhaust pipes of naval gas turbine, Fatigue and Fracture of Engineering Materials and Structures, 27,10, pp.861-873, 2004.

Claudio, R.A., Branco, C.M., Gomes, E.C., Byrne, J., Harrison, G.F., Winstone, M.R., "Fatigue life prediction and failure analysis of a gas turbine disc using the finite element method, Fatigue and Fracture of Engineering Materials and Structures, 27,8, pp. 849-853, 2004.

— papers in national journals

Caeiro Antunes, J, Antunes, SD, Guerra Rosa, L, Anjinho, CA, "Análise de Assinaturas de Corte para Optimização do Processo de Serragem em Máquinas-Ferramenta Mono e Multilâminas", Revista Rochas & Equipamentos, n.º 73 (XX): 71-76, 2004.

Reis, L., Fonseca, A. e Freitas M., "Monitorização de cargas em voo para avaliação de integridade estrutural em aeronaves", Mecânica Experimental, 10, 2004.

B - Communications

- In international meetings

Oliveira, FAC, Páscoa, J, Melo, M, Fernandes, JC, Guerra Rosa, L, Sacramento, J, Valente, MA, "Mechanical Failure Mechanisms in a Micrograined WC-Co Hardmetal", Proceedings 9th Portuguese Conference on Fracture www.est.lps.pt/9pcf, Sociedade Portuguesa de Materiais, E.S.T. Setúbal, 18-20 February, 2004, 10 pp.

Figueiredo, I, Guerra Rosa, L, "A View on the Applicability of Maximum Likelihood Estimation", VAFTEM WORKSHOP on Testing Procedures and Standards for High Performance Fibres (included in ECCM11 - The 11th European Conference on Composite Materials), Rhodes, Greece, 1 June, 2004.

Amaral, PM, Anjinho, CA, Fernandes, JC, Guerra Rosa, L, "Evaluation of Metallic Binding Systems used in Diamond Tools for Stone Cutting", Proceedings PM2004, World Congress on Powder Metallurgy, Vienna, Austria, 17-21 October 2004, (edited by European Powder Metallurgy Association - ISBN 1899072 15 2), Volume 3, pp 711-717.

Anjinho, CA, Amaral, PM, Fernandes, JC, Guerra Rosa, L, "Análise de ferramentas diamantadas utilizadas no processo de desbaste de um grão português", Proceedings VI Congresso Internacional da Pedra Natural do Alentejo, Vila Viçosa, 14 e 15 Outubro de 2004, ed. C. M. V. Viçosa (2004) 7 pp.

Fortes, M. A., Rosa, M, Emília, Vaz, M, Fátima and Teixeira, P. I. C., "Mechanical instabilities of foam clusters between parallel plates", Eufoam 2004 - 5th European Conference in Foams, Emulsions and Applications, Champs-sur-Marne, Université de Marne-la-Vallée, France, July, 2004.

Teixeira, P. I. C., Vaz, M, Fátima and Fortes, M. A., "Topological and geometrical transitions in two-dimensional Plateau borders under gravity", Eufoam 2004 - 5th European Conference in Foams, Emulsions and Applications, Champs-sur-Marne, Université de Marne-la-Vallée, France, July, 2004.

Rosa, M. Emília, "A cortiça", I Jornadas Ibéricas do Montado - V Feira do Montado, Portel, Portugal, November, 2004.

Freitas, M., Li, B. and Reis, L., "Analytical and experimental studies on fatigue crack path under complex multiaxial loading", XXI Encuentro del Grupo Español de Fractura, Punta Umbria, España, 24-26 March 2004.

Freitas, M., Reis, L. and Li, B., "Multiaxial mixed-mode cracking and small crack initiation and propagation", 7th International Conference on Biaxial/Multiaxial Fatigue and Fracture, Berlin, Germany, 28th June 1st July 2004.

Fonte, M., Reis, L., Romeiro, F. and Freitas, M., "The effect of steady torsion in power shafts under rotating bending", 7th International Conference on Biaxial/Multiaxial Fatigue and Fracture, Berlin, Germany, 28th June 1st July 2004.

Li, B., Reis, L. and Freitas, M., "Simulations of multiaxial stress/strain in smooth and notched specimens", 7th International Conference on Biaxial/Multiaxial Fatigue and Fracture, Berlin, Germany, 28th June 1st July 2004.

Milharadas, M., Reis, L. and Freitas, M., "Damage tolerance analysis of aircraft structures under service loading", First International Conference on Engineering Failure Analysis, Lisbon, Portugal, 12-14 July 2004.

Freitas, M., Reis, L., Leite, M. and Li, B., "Analysis of failures due to the effects of the non-proportional multiaxial fatigue loadings", First International Conference on Engineering Failure Analysis, Lisbon, Portugal, 12-14 July 2004.

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Leite, M., Silva, A., Freitas, M., "Elastic behaviour of reinforced sandwich beams", The Seventh International Conference on Computational Structures Technology, Lisbon, Portugal, 7-9 September 2004.

Freitas, M., Reis, L. and Li, B., "Fatigue parameters for estimating non-proportional multiaxial fatigue lives", 9th Portuguese Conference on Fracture, Setúbal, 18-20 February 2004.

Leite, M., Silva, A., Freitas, M., "Elastic Behaviour of sandwich beams. Part 1: experimental study", 9th Portuguese Conference on Fracture, Setúbal, 18-20 February 2004.

Leite, M., Silva, A., Freitas, M., "Elastic Behaviour of sandwich beams. Part 2: numerical study", 9th Portuguese Conference on Fracture, Setúbal, 18-20 February 2004.

Marat-Mendes, R. and Freitas, M., "A testing procedure for mixed-mode delamination of composite materials", 9th Portuguese Conference on Fracture, Setúbal, 18-20 February 2004.

Pereira, Sónia G., Reis, Nuno, Nunes, Teresa G., "Stray-Field MRI Studies on Light-Curing Reactions of Dimethacrylate Monomers", 1st EENC/AMPERE joint meeting, Lille (France), 6-11 September, 2004.

Smith, Patrick J., Dearden, Angela L., Shin, Dong-Youn, Stringer, Jonathan, Reis, N., Derby, Brian and O'Brien, Paul, "Inkjet printing of conductive silver tracks", International Workshop on Ink-jet Printing of Functional Polymers and Materials, 28 June 2004, Eindhoven, The Netherlands.
(<http://www.schubert-group.de/COMBIMAT/Program%20workshop.pdf>)

Saunders, R., Bosworth, L., Gough, J., Derby, B., Reis, N., "Selective cell delivery for 3d tissue culture and engineering", ECM V- The Cell Biomaterial Reaction June 28-30 2004, Davos, Switzerland.
(<http://www.ecmjournal.org/journal/supplements/vol007supp01/pdf/vol007supp01a84.pdf>)

Reis, N., "Ink-jet Printing: Old technology enabling innovative ideas", International Centre for Science and High Technology / United Nations Industrial Development Organization - Expert Group Meeting on 'Advances in Computer Aided Materials Engineering', Trieste, Italy, 9-11 December 2004.

Diogo, A.C., "Rheological and dynamic mechanical behaviour of polyolefin nanocomposites containing hydrotalcite: preliminary results", 9th International Workshop on Advances in Experimental Mechanics, Bled (Slovenia), 8-14 August 2004.

Diogo, A.C., Baptista, E., Santos, J.M., Ribeiro, M.R., "Rheological characterization of functionalized polyethylenes through metallocene synthesis", Recent Developments in Shear and Extensional Flows, Combloux (France), 10-18 January 2004.

Diogo, A.C., Baptista, E., Chainho, I., Velasco, J.I., "Rheological behaviour of polyolefin nanocomposites containing hydrotalcite: preliminary results", Euclid CEPA3 Workshop on Nanomaterials: Recent Developments, Lisboa (P), 25 February 2004.

Costa, A., Piteira, F., Diogo, A.C., Sousa, I., "Glass transition in traditional cookies with different fibres", IBERHEO'04 - Joint Portuguese-Spanish Rheology Meeting, Beja (P), 9-11 September 2004.

Diogo, A.C., "Modification of the viscoelastic material functions of triblock copolymers induced by pre-shear" IBERED'04 - Joint Portuguese-Spanish Rheology Meeting, Beja (P), 9-11 September 2004.

Brito, A.S., "The development of Fracture Mechanics, Proc. 9th Portuguese Conference on Fracture, 18-20/02/04, Ed. SPM, Portugal, pp. 305-318, 2004.

Claudio, R.A., Maria, J., Pereira, D., Baptista, R., Branco, C.M., Byrne, J., "Development of a DC potential drop system controlled by computer", Proc. 9th Portuguese on Fracture, Setúbal, 18/20 February 2004, Ed. SPM, Lisbon, Portugal, pp. 39-47, 2004.

Silva, J.M., Branco, C.M., "Preliminary thermal fatigue evaluation of a nickel base superalloy for gas turbine applications", Ed. SPM, pp. 51-59, 2004.

Leite, V., Branco, C.M., Baptista, R., "Preliminary study of the fatigue behaviour in welded joints of stainless steels", Ed. SPM, pp. 79-91, 2004.

Reis, A., Branco, C.M., Sousa e Brito, A., "Fatigue behaviour of grey cast iron used in cylinder liners of diesel engines", Ed. SPM, pp. 457-465, 2004.

Morgado, T., Branco, C.M., Infante, V., "Local elastoplastic deformations in the railway couplings used for coal transport, Ed. SPM, pp. 485-495, 2004.

Martins, R.F., Branco, C.M., Gomes, E.C., Coelho, A.G., "Finite element analysis of a gas turbine exhaust system of a military navy ship", Ed. SPM, pp. 509-521, 2004.

Branco, C.M., Infante, V.N., "Failures of mechanical components", invited lecture, Porc. 1st Int. Conf. Engineering Failure Analysis, ICEFA1, 12-14 July 2004, Ed. Elsevier, Paper 1.01, 2004.

Martins, R.F., Branco, C.M., Gomes, E.C., Ed. Elsevier, "A failure analysis study in exhaust tubes of naval gas turbines", 2004.

- In national meetings

Caeiro Antunes, J, Anjinho, CA, Antunes, SD, Guerra Rosa, L, Fernandes, JC, Amaral, PM, "Análise de Deformações em Lâminas de Corte durante o Processo de Serragem de Rochas Ornamentais", 5º Encontro Nacional de Análise Experimental de Tensões e Mecânica Experimental, www2.dem.uc.pt/apaet/, APAET, Coimbra, 21-23 Janeiro (2004), 6 pp.

Guerra Rosa, L, "Próteses com Osteointegração", Jornadas Temáticas do ICEMS 2004 "Materiais e Tecnologias para Aplicações Biomédicas", www.icems.lst.utl.pt/jornadas/icems2004/, Instituto Superior Técnico, Lisboa, 18 e 19 de Outubro 2004.

Rosa, M. Emília, "Rolhas e engarrafamento: as propriedades da cortiça", M. Emília Rosa, II Jornada Técnica Transnacional Cortiça - Vinho, Faro, Portugal, November, 2004.

Milharadas, M., Reis, L., Fonseca, A. and Freitas, M., "Damage tolerance analysis of aircraft structures under service loading", 5º Encontro Nacional de Análise Experimental de Tensões e Mecânica Experimental, Coimbra, 21-23 de Janeiro de 2004.

Freitas, M., Li, B. and Reis, L., "Comportamento em fadiga de materiais metálicos sob solicitação multiaxial", VIII Congresso Nacional de Mecânica Aplicada e Computacional, Lisboa, 31 de Maio a 2 de Junho, 2004.

Carvalho, R. and Freitas, M., "Resistência residual à fadiga em compressão de um CFRP laminado após reparação", VIII Congresso Nacional de Mecânica Aplicada e Computacional, Lisboa, 31 de Maio a 2 de Junho, 2004.

Leite, M., Silva, A., Freitas, M., "Ensaio experimental e modelação numérica de um reboque refrigerado em construção sandwich", VIII Congresso Nacional de Mecânica Aplicada e Computacional, Lisboa, 31 de Maio a 2 de Junho, 2004.

Durão, L., Tavares, J., Marques, A., Freitas, M. e Magalhães, A., "Caracterização de danos de maquinaria em placas compostas", VIII Congresso Nacional de Mecânica Aplicada e Computacional, Lisboa, 31 de Maio a 2 de Junho, 2004.

Leite, A. and Travassos J., "Flexão de elementos curvos em materiais compostos obtidos por autoclave", VIII Congresso Nacional de Mecânica Aplicada e Computacional, Lisboa, 31 de Maio a 2 de Junho, 2004.

Silva, A., Marcelino, J.R., "The teaching of product development in engineering design", Semana dos Moldes 2004, RPD 2004 Rapid Product Development Event, Marinha Grande, 12-13 Outubro 2004.

Nunes, Teresa G., "Novas Resinas Compostas Fotopolimerizáveis com Potenciais Aplicações em Dentisteria Restauradora", Jornadas do ICEMS, IST, 18-19 October 2004.

Reis, N., "Engenharia de Tecidos Assistida por Computador", Jornadas ICEMS, 18-19 October 2004

Reis, N., "Materiais e Biomateriais", Dia Aberto da Ciência e da Tecnologia, Universidade Católica Portuguesa, April 2004.

Diogo, A.C., "Comportamento reológico da cortiça e avaliação da qualidade", Seminário "A Qualidade da Cortiça: da Produção ao Produto Final", S. Maria de Lamas, 26 October 2004.

Diogo, T., Branco, C.M., Infante, V., "Estudo da fissuração das caixas reductoras das locomotivas da série 2600", Encontro da APAET, Coimbra, 21, Paper 35, 23/01/04,

C - Technical reports

24 MONTH Progress Report of E.U. GROWTH Project "Ceramic and Carbon Fibers: Validation of Testing Methods" (contract no. G6RD-CT-2001-00523), March 2004.

Mid-Term Progress Report of E.U. GROWTH Project "Machine Vision Inspection of Polished Stone" (contract no. G1ST-CT-2002-50271), May 2004.

18 Month Progress Report of E.U. GROWTH Project "Machine Vision Inspection of Polished Stone" (contract no. G1ST-CT-2002-50271), October 2004.

1st year Progress Report Project "Standardisation of cork quality evaluation through the development of a harmless electronic device" (contract nº G6ST-CT-2002-50334), February 2004.

Freitas, M., "Caracterização do modo de falha da pá do primeiro andar do compressor do motor T56-A-14 S/N AE107096", Maio de 2004.

Freitas, M., "Caracterização da falha de três pá da fan do motor GE CF700 S/N 299-102", Dezembro de 2004.

Branco, C.M., Infante, V., Montemor, F., Gomes, E.C., Sousa e Brito, A., Relatório sobre as falhas da aeronave CESSNA (confidential), 150 páginas, Setembro de 2004.

Meetings organization

A. Silva, Member of the Scientific Committee of the International Conference for Advanced Mechanical Engineering, Algiers, November 30 to December 2nd, 2004.

M. de Freitas, M. da Fonte, Members of the Scientific Committee of the Seventh International Conference on Biaxial/Multiaxial Fatigue and Fracture, Berlin, Germany, 28th June 1st July 2004.

Nuno Reis: Workshop on Bioprinting and Biopatterning, September 2004, Manchester Conference Centre, UMIST, UK. (www.umist.ac.uk/material/bioprint/)

Nuno Reis: Jornadas ICEMS, October 2004. (<http://www.icems.ist.utl.pt/jornadas/icems2004/>)

A.C. Diogo: Member of International Advisory Board of EPF Europolymer Conference "Organized, Polymer-based Structures in Water and their Applications" (Gargnano, Italia, 30 May - 4 June 2004).

A.C. Diogo: Member of Comité Científico of SLAP'2004 including "IX Simpósio Latino-americano de Polímeros" and "VII Congreso Iberoamericano de Polímeros", (Valencia, Espanha, 11-16 July 2004).

A.C. Diogo: President of Organizing Committee and Scientific Committee of IBEREO'04, Encontro Ibérico de Reologia (Beja, 9-11 September 2004).

E - Advanced training

- PhD Thesis

P. M. Amaral concluded his PhD Thesis, entitled "Mechanical Behaviour of Ornamental Stones", I.S.T., Universidade Técnica de Lisboa, examination date: November 4th, 2004.

Luis F. G. Reis, "Comportamento mecânico de aços em fadiga multiaxial a amplitude de carga constante e síncrona", 5 de Novembro de 2004. (concluded)

Synthesis and Study of Novel Dental Polymeric Materials by Advanced NMR and MRI Techniques, Sónia G. Pereira, Supervisor Teresa Nunes, Starting Date 1999/10/01.

Glass Ionomers for Dentistry: Synthesis and Study by Advanced NMR and MRI Techniques, Ricardo A. Pires, Supervisor Teresa Nunes, Finishing Date 2004/12/10.

Development of novel nanostructured composites based on in situ reinforced polymers, Nadya Dencheva, Supervisor Teresa Nunes, Starting Date 2003/10/01.

- Master Thesis

C A Anjinho concluded his Master Thesis, entitled "Analysis of Diamond Tools used for Cutting and Grinding Marbles and Granites", I.S.T., Universidade Técnica de Lisboa, examination date: May 3rd, 2004.

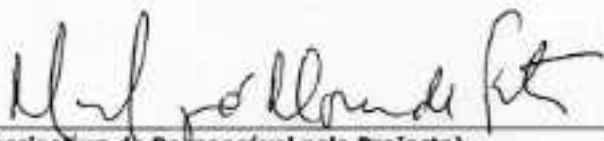
Marco Leite, "Estudo experimental, analítico e numérico de vigas em construção sandwich reforçada com aplicação ao transporte refrigerado de bens perecíveis", 29 Novembro 2004. (concluded)

Others

L Guerra Rosa obtained his Aggregation (Doctor of Science/Habilitation) in Materials Engineering, by Universidade Técnica de Lisboa, examination dates: February 2nd and 3rd, 2004.

Spin-out initiative "Printable Functional Materials", presented at the last round of the Research Councils Business Plan Competition, 24th February 2004 at The Royal Society, London, UK. (Nuno Reis)


Data: quarta-feira, 30 de Março de 2005



(assinatura do Responsável pelo Projecto)

30-03-2005 - 15:44

 UNIÃO EUROPEIA - Fundos Estruturais

 Governo da República Portuguesa

 **Ciência, Inovação 2010** Programa Operacional Ciência e Inovação 2010

Instituto de Ciência e Engenharia de Materiais e Superfícies (Lisboa) - ICEMS [84]

[Página principal > Relatório científico 2004]

Sub-projecto**Sub-project**

FUNCTIONAL MATERIALS IN ADVANCED CHEMICAL PROCESSES

Investigador responsável**Project leader**

Maria Norberta Neves Correia Pinho

Resumo da actividade desenvolvida

The research activity took place in three main directions:

A - Catalytic Reaction Processes

- 1 - Catalytic Functionalization of Light Alkanes: Preparation and detailed physical chemical characterization (before and after catalytic tests) of unsupported and supported catalysts based upon mixed oxides by citrate technique. Test of the prepared catalysts for the oxidative dehydrogenation of n-butane and isobutane. Correlation of physical - chemical, thermogravimetric reduction, temperature programmed reduction and temperature programmed desorption experimental data of unsupported and silica (of different surface areas) supported nickel molybdate catalysts with their catalytic activity for the oxidative dehydrogenation of isobutane.
- 2 - Selective Oxidation of Olefins over Mixed Oxides: Computation of the diffusivity of oxygen anions in the lattice of α , β , γ and multiphase bismuth molybdate catalysts, using thermogravimetric reduction data with 1-butene, hydrogen and butadiene. Study of the oxygen temperature programmed desorption and temperature programmed reduction by hydrogen of the pure and mixed phases of bismuth molybdate catalysts. Correlation of the results of with the activity of the mentioned catalysts for the oxidative dehydrogenation of 1-butene. Test of the prepared mixed oxide catalysts by citrate technique for the oxidative dehydrogenation of 1-butene.
- 3 - Polymerisation and Technology of Polymerisation of Olefins over Metallocenic Catalysts: Homo and copolymerization of vinyl based monomers by transition metal catalysts. Synthesis of unsaturated polyolefins by means of diene comonomers and chemical modification of these copolymers, for development of novel functional polymeric materials. Development of supported metallocene systems on inorganic mesoporous materials as catalysts for polymerization of vinyl monomers. Analysis of the thermal and mechanical properties of the copolymer and correlation studies with the composition and distribution of polar units along the polymeric chain.
- 4 - Selective Catalytic Oxidations of Methanol and Ethanol: Investigation of the cerium role on the catalytic behavior of silica-supported MoFeO catalysts for the methanol oxidation. Test of mixed oxide catalysts prepared by citrate technique for the selective oxidation of low alcohols like methanol and ethanol.

B - Membranes and Membrane Processes (MSP)**1 - Preparation, functionalization and characterization of polymeric membranes**

Bi-soft segment urethane/urea polymer membranes were synthesized with soft segments of Polypropylene/Polybutadiene (PU/PBDO) and Polypropylene/Polydimethylsiloxane (PU/PDMS). The PU/PBDO and PU/PDMS membranes were extensively characterised through Infrared Spectroscopy in Attenuated Total Reflectance mode (ATR-FTIR), Positron Annihilation Spectroscopy (PALS) (collaboration with ICEMS Coimbra) and Scanning (SEM) and Transmission Electron Microscopy (TEM). Hard/soft/soft segment phase separation was correlated to gas permeation properties. (Polymer Composites, 25(1) (2004); Materials Science Forum, 445-446 (2004)). The membranes were tested for gas permeation and for Bio and Hemo-compatibility for their application in extra-corporal blood oxygenators. Surface charge properties and zeta-potential of commercial membranes were investigated.

Preparation of cellulose acetate membranes with control of pore sizes was carried out and their permeation performance investigated.

2 - Modelling of Flow and Mass Transfer at Membrane/Fluid Interfaces

Nanofiltration (NF) and Ultrafiltration (UF) have been the subject of Computer Fluid Dynamics (CFD) simulations and permeation experiments. These were performed in a flat-sheet cell. For NF the cell feed channel accommodates ladder-type spacers typical of spiral-wound modules (Computers and Structures, 82 (2004)). The UF results are relative to the effect of high permeation rates on the feed flow structures and mass transfer in protein (lysozyme)/salt (NaCl)/water systems. (Int. J. Heat & Mass, In Press)

3 - Development of Membrane Hybrid Processes

Integration of nanofiltration/steam stripping for the treatment of coke plant ammoniacal wastewaters (J. Mem. Sc 242 (2004), 87-95.)

Integration of UF/NF in drinking water production (J. Mem. Sci. (In Press)).

Wine clarification and tartaric stabilization were investigated

Production of wines with low alcohol content led to a patent.

UF/NF for Cheese Whey Recovery

Protein Recovery from Fish Meal Wastewaters by Ultrafiltration

Desalination of brackish water by reverse osmosis.

Downstream Processing of Fermentation Broths for the Optimization of the Isolation of Antibiotics.

C - Fuel Cells

During the period of 2004 we pursued studies of PEMFC and AFC systems. We were particularly concerned with the development of mischmetal-based hydrogen storage electrode alloys (HSA). The electrochemical properties of PEMFC MEA using differently prepared HAS NiNi₃.65Co_{0.85}Al_{0.3}Mn_{0.3} alloys as anode electrocatalysts instead of Pt/C alloys were studied, and the materials were developed. Different surface treatments were investigated and the electrochemical and electrocatalytic properties of the HAS electrodes were characterised. The effect of aluminizing on the hot corrosion resistance of two nickel-chromium alloys were studied. Nanostructured films of C60 were prepared electrochemically. Moreover the semiconducting properties of oxide/sulphide layers were characterized.

Indicadores de execução 2004**A - Publicações**

	Previsto	Realizado
Livros	1	4
Artigos em revistas internacionais	20	14
Artigos em revistas nacionais	3	1
B - Comunicações		
Em congressos científicos internacionais	23	20
Em congressos científicos nacionais	5	4
C - Relatórios	0	0
D - Organização de seminários e conferências	1	1

E - Formação Avançada

Teses de Doutoramento

Teses de Mestrado

Outra

F - Modelos

G - Aplicações computacionais

H - Instalações Piloto

I - Protótipos laboratoriais

J - Patentes

2	1
1	1
0	1
4	0
3	0
0	0
4	0
1	1

Publicações em 2004

A - Publications

- Books and chapters of books

de Pinho, M.N., Costa, A.R., Queiroz, D.P. "Preparação e caracterização de membranas para separações industriais", In "Química de Polímeros" Editores, de Melo, J.S., Moreno, M.J., Burrows, H.D., Gil, M.H., Imprensa da Universidade de Coimbra, 2004.

Geraldes, V., Semião, V. and de Pinho, M.N., "Optimization of Ladder-type Spacers for Nanofiltration and Reverse Osmosis Spiral-wound Modules by Computational Fluid Dynamics" in "European Symposium on Computer-Aided Process Engineering-14" A. Barbosa-P and H. Matos Editors, Elsevier, Amsterdam, 2004.

Afonso, D., "Processos de separação por membranas - Como se classificam estes processos?", em "Tecnologias", Enciclopédia Nova Activa Multimédia, Vol. 14, Lexicultural, direcção Roberto Carneiro, 72-75 November, 2004.

Ribeiro, M. Rosário, Santos, J. Moniz, "Poliolefinas funcionais: Síntese e propriedades", em Química de Polímeros, Editora Imprensa Universidade de Coimbra - IUC, 2004.

- Papers in international journals

Ajo, M. D., Jaber, J. O. and Mohsen, M. S.; "Brackish groundwater treatment by reverse osmosis in Jordan", Desalination, 164, 157-171, 2004.

Afonso, M. D., Ferrer, J. and Bórquez, R.; "An economic assessment of proteins recovery from fish meal wastewaters by ultrafiltration", Trends in Food Science and Technology, Vol. 15, Issue 10, 506-512, 2004.

Geraldes, V., Semião, V., and de Pinho, M.N., "Concentration polarisation and flow structure within nanofiltration spiral-wound modules with ladder-type spacers", Computers and Structures, 82, 1561-1568, 2004.

Minhalma, M. and de Pinho, M.N., "Integration of Nanofiltration /Steam Stripping for the Treatment of Coke Plant Ammoniacal Wastewaters", Journal of Membrane Science, 242, 87-95, 2004.

Ferreira, Marques, M.F., Gordo, P.M., Lopes Gil, C., de Lima, A.P., Queiroz, D.P., de Pinho, M.N., Kajcsos, Z., "Gas Permeability and Temperature-Dependent Free-Volume Studies in Polyurethane Membranes by Positron Lifetime and Doppler Spectroscopy", Materials Science Forum, 445-446, 289-291, 2004.

Borges, J.P., Godinho, M.H., Martins, A.F., Stamatialis, D.F., De Pinho, M.N., Belgacem, M.N., "Tensile properties of cellulose fibre reinforced hydroxypropylcellulose films", Polymer Composites, 25(1), 102-110, 2004.

Costa, A.R., de Pinho, M.N., "Coagulation/ Flocculation/ Ultrafiltration for natural organic matter removal in drinking water production", Proceedings of World Water Congress and Exhibition, Marrakech, September, 2004.

Magueijo, V., Minhalma, M., Queiroz, D., Geraldes, V., de Pinho, M.N. and Macedo, A., "Reduction of wastewaters and valorisation of by-products from Serpa cheese manufacture using nanofiltration", Proceedings of World Water Congress and Exhibition, Marrakech, September, 2004.

Madeira, L.M., Portela, M.F., and Mazzocchia, C., "Nickel Molybdate Catalysts and Their Use in the Selective Oxidation of Hydrocarbons", Catalysis Reviews, 46 (1), 53 - 110, 2004.

Cerrada, M.L., Benavente, R., Pereña, J.M., Pérez, E., Santos, J. Moniz, Ribeiro, M. Rosário, "Structural Characterization and Mechanical Behavior of Metallocenic Copolymers of Ethylene and 5, 7 - Dimethylocta - 1, 6 - Diene", Macromol. Symp. 213, 315 - 325, 2004.

Dolatkhani, M., Cramail, H., Deffieux, A., Ribeiro, M. Rosário, Santos, Jorge M., Bordado, João M., "Synthesis of polyolefin based materials with improved thermo - oxidative stability", Macromol. Symp., 213, 347-356, 2004.

Cerrada, M.L., Benavente, R., Pereña, J.M., Pérez, E., Santos, J. Moniz, Ribeiro, M. Rosário, "Metallocenic Ethylene- 5,7 - Dymethyl - 1,6 - Octadiene Copolymers: Structural Characterization and Mechanical Behavior", J. Polym. Sci. Part B, Polymer Physics, 42, 3797 - 3808, 2004.

Lopes, D.E.B., Marques, M.F.V., Dias, M.L., Ribeiro, M. Rosário, Lourenço, J.P.G., "Copolymerisation of Ethylene and Non - Conjugated Dienes with Metallocene / Methylaluminoxane System Supported on MCM - 41 Mesoporous Material", European Polymer Journal, 40, 2555 - 2563, 2004.

Sequeira, C.A.C. and Anastassakis, G.N., "Solid state electrochemical sensors for the metallurgical industry", Mineral Wealth, No. 132, 47-55, 2004.

- Papers in national journals

Antunes, R.M.M. and Sequeira, C.A.C., "Ionic insertion in copper hexacyanoferrates", Ciência & Tecnologia dos Materiais, 16(1), 66-73, 2004.

B - Communications

- In international meetings

Costa, A.R., de Pinho, M.N., "Coagulation/ Flocculation/ Ultrafiltration for natural organic matter removal in drinking water production", Proceedings of World Water Congress and Exhibition, Marrakech, September, 2004.

Magueijo, V., Minhalma, M., Queiroz, D., Gerales, V., de Pinho, M.N. and Macedo, A., "Reduction of wastewaters and valorisation of by-products from Serpa cheese manufacture using nanofiltration", Proceedings of World Water Congress and Exhibition, Marrakech, September, 2004.

Afonso, M. D., Ferrer, J. and Bórquez, R.; "An Economic Assessment of Protein Recovery from Fish Meal Wastewaters by Ultrafiltration", EuroMed 2004 Conference on Desalination Strategies in South Mediterranean Countries, Marrakech, Morocco, May - June 2004.

Magueijo, V., Semião, V., de Pinho, M.N., "Modeling of protein ultrafiltration using computer fluid dynamics", "Gordon Research Conference - Membranes: materials and processes", Colby-Sawyer College, New London, NH, EUA, 1-2 August, 2004.

Magueijo, V., Semião, V., de Pinho, M.N., "Hydrodynamics and mass transfer modeling in lysozyme ultrafiltration", Proceedings do "6th Network Young Membranes", Hamburgo, Alemanha, 22-24 September, 2004.

Godinho, M. H., Figueirinhas, J L., Dias C.R., Zhao, C.T., de Pinho, M. N., "New Mechanico-Optical Effects on a Bi-Soft Polyurethane Membrane", Workshop on Nanomaterials, European Cooperation for the Long Term in Defense (EUCLID), Common European Priority Area (CEPA) 3, Instituto Superior Técnico, Lisbon, Portugal, 25th February 2004.

Costa, A.R., de Pinho, M.N., "Coagulation/Flocculation/Ultrafiltration for Humic Substances Removal in Drinking Water Production", Euromembrane, Hamburgo, Alemanha, 22-24 September, 2004.

Magueijo, V., Semião, V., de Pinho, M.N., "Hydrodynamics and mass transfer modeling in lysozyme ultrafiltration", Proceedings do "Euromembrane 2004", Hamburgo, Alemanha, 28 September - 1 October, 2004.

Cavaco Morão, A. I. Brites Alves, A. M.; Afonso, M. D. and Fernandes, J. C. S.; "Zeta Potential of NF Membranes: Influence of Solution Composition and Membrane State", Euromembrane 2004, Hamburg, Germany, September - October 2004.

Brites Alves, A. M.; Cavaco Morão, A. I.; "Concentration of broths containing clavulanic acid using nanofiltration", EUROMEMBRANE 2004, 2 September - 1 October, Hamburg, Germany, 2004.

Gerales, V., Macedo, A., Martins, A., Martins, M., Duarte, E. and de Pinho, M.N., " Ultrafiltration of ovine cheese whey for COD abatement and recovery of protein fraction" Proceedings of the 4th World Water Congress and Exhibition, Marrakech, Morocco, 19-24 September 2004.

Costa, A.R., de Pinho, M.N., "Coagulation/ Flocculation/ Ultrafiltration for natural organic matter removal in drinking water production", 4th World Water Congress, Marrakech, Marrocos, 19-24 September, 2004.

Costa, A.R., de Pinho, M.N., "Ultrafiltration and nanofiltration for drinking water production", Gordon Research Conference on Membranes: materials and processes, New Hampshire, U.S.A., 1-6 August, 2004.

Queiroz, D.P., Gonçalves, M.C., Ribeiro, M.R., de Pinho, M.N., "Structural characteristics and gas permeation properties of Polydimethylsiloxane/poli(propylene oxide) urethane/urea bi-soft segment membranes", Euromembrane 2004, Hamburgo, Alemanha, 27 September - 1 October, 2004.

Gerales, V., Semião, V. and de Pinho, M.N., "Optimization of Ladder-type Spacers for Nanofiltration and Reverse Osmosis Spiral-wound Modules by Computational Fluid Dynamics", "European Symposium on Computer-Aided Process Engineering-14" A. Barbosa-P and H. Matos Editors, Elsevier, Amsterdam, 2004.

Ribeiro, M. Rosário, Santos, J. M., Cramail, H., Deffieux, A., "Comparative Behavior of Metallocene System for Copolymerization of Ethylene with a Protected Monomer Containing a Carboxyl Group", 40 th IUPAC World Polymer Congress of the Macromolecular Division of the International Union of Pure and Applied Chemistry - Macro 2004, Paris, 4 - 9 July, 2004.

Laes, D.E.B., Marques, M.F.V., Dias, Marcos L., Ribeiro, M. Rosário, Lourenço, J.P., "Copolymerization of Ethylene and 5, 7 - Ethylocta - 1, 6 - Diene with Metallocene / Methylaluminoxane System Supported on MCM - 41 Mesoporous Material", International Olefin Polymerization Conference, Moscow, Russia, 22 - 25 June, 2004.

Soares, Ana Paula Vieira, Santos, Patrícia Isabel, Portela, Manuel Farinha, "Ethanol Oxidative Dehydrogenation Over MOO₃/ (Zr O₂ - WO₃)", 13th International Congress on Catalysis, Paris, France, July 11 - 16, 2004.

Sequeira, C.A.C., Chen, Y., Anastassakis, G., "Galvanostatic oxidation of high TOC plating baths", REWAS'04 - Global Symposium on Recycling, Waste treatment and Clean Technology, Madrid, Spain, TMS - INASMET, vol. II, 1117-1124, 2004.

Sequeira, C.A.C., Chen, Y., Anastassakis, G., "Electrochemical reduction of vanadium (V) ions in aqueous solution", REWAS'04 - Global Symposium on Recycling, Waste treatment and Clean Technology, Madrid, Spain, TMS - INASMET, vol. III, 2197-2204, 2004.

- In national meetings

Gerales, V., Magueijo, V., de Pinho, M.N., "Concentração e Purificação da Fracção de Oligossacáridos do Soro do Queijo de Serpa por Nanofiltração/Diafiltração: Simulação e Optimização" Actas do Congresso de Métodos Computacionais em Engenharia, Laboratório Nacional de Engenharia Civil, Lisboa, 31 de Maio - 2 de Junho 2004.

Magueijo, V., Semião, V., de Pinho, M.N., "A influência da sucção no desenvolvimento da camada limite em problemas de ultrafiltração", Proceedings do "Congresso de Métodos Computacionais em Engenharia - CMCE", Lisboa, Portugal, 31 Maio - 2 Junho, 2004.

Magueijo, V., Semião, V., de Pinho, M.N., "Modelação do escoamento e da transferência de massa na ultrafiltração de soluções aquosas de lisozima e sal", Proceedings of "Congresso de Métodos Computacionais em Engenharia-CMCE", Lisboa, Portugal, 31 Maio-2 Junho, 2004.

Pinto, I., Queiroz, D.P., Gulomar, J., Gil, M.H., De Pinho, M.N., "Evaluation of the Permeability and Hemocompatibility of Polyurethanes with Two Soft Segments", BioÉvora 2004, Évora, Portugal, 9 a 11 de setembro de 2004.

D - Meetings organization

Costa, A.R., de Pinho, M.N., "Coagulation/ Flocculation/ Ultrafiltration for natural organic matter removal in drinking water production", Proceedings of World Water Congress and Exhibition, Marrakech, September, 2004.

Magueijo, V., Minhalma, M., Queiroz, D., Gerales, V., de Pinho, M.N. and Macedo, A., "Reduction of wastewaters and valorisation of by-products from Serpa cheese manufacture using nanofiltration", Proceedings of World Water Congress and Exhibition, Marrakech, September, 2004.

Afonso, M. D., Ferrer, J. and Bórquez, R.; "An Economic Assessment of Protein Recovery from Fish Meal Wastewaters by Ultrafiltration", EuroMed 2004 Conference on Desalination Strategies in South Mediterranean Countries, Marrakech, Morocco, May - June 2004.

Magueijo, V., Semião, V., de Pinho, M.N., "Modeling of protein ultrafiltration using computer fluid dynamics", "Gordon Research Conference - Membranes: materials and processes", Colby-Sawyer College, New London, NH, EUA, 1-2 August, 2004.

Magueijo, V., Semião, V., de Pinho, M.N., "Hydrodynamics and mass transfer modeling in lysozyme ultrafiltration", Proceedings do "6th Network Young Membranes", Hamburgo, Alemanha, 22-24 September, 2004.

Godinho, M. H., Figueirinhas, J L., Dias C.R., Zhao, C.T., de Pinho, M. N., "New Mechanico-Optical Effects on a Bi-Soft Polyurethane Membrane", Workshop on Nanomaterials, European Cooperation for the Long Term in Defense (EUCLID), Common European Priority Area (CEPA) 3, Instituto Superior Técnico, Lisbon, Portugal, 25th February 2004.

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Laes, D.E.B., Marques, M.F.V., Dias, Marcos L., Ribeiro, M. Rosário, Lourenço, J.P., "Copolymerization of Ethylene and 5, 7 - Ethylocta - 1, 6 - Diene with Metallocene / Methylaluminoxane System Supported on MCM - 41 Mesoporous Material", International Olefin Polymerization Conference, Moscow, Russia, 22 - 25 June, 2004.

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Sequeira, C.A.C., Chen, Y., Anastassakis, G., "Galvanostatic oxidation of high TOC plating baths", REWAS'04 - Global Symposium on Recycling, Waste treatment and Clean Technology, Madrid, Spain, TMS - INASMET, vol. II, 1117-1124, 2004.

Sequeira, C.A.C., Chen, Y., Anastassakis, G., "Electrochemical reduction of vanadium (V) ions in aqueous solution", REWAS'04 - Global Symposium on Recycling, Waste treatment and Clean Technology, Madrid, Spain, TMS - INASMET, vol. III, 2197-2204, 2004.

- In national meetings

Gerales, V., Magueijo, V., de Pinho, M.N., "Concentração e Purificação da Fracção de Oligossacáridos do Soro do Queijo de Serpa por Nanofiltração/Diafiltração: Simulação e Optimização" Actas do Congresso de Métodos Computacionais em Engenharia, Laboratório Nacional de Engenharia Civil, Lisboa, 31 de Maio - 2 de Junho 2004.

Magueijo, V., Semião, V., de Pinho, M.N., "A influência da sucção no desenvolvimento da camada limite em problemas de ultrafiltração", Proceedings do "Congresso de Métodos Computacionais em Engenharia - CMCE", Lisboa, Portugal, 31 Maio - 2 Junho, 2004.

Magueijo, V., Semião, V., de Pinho, M.N., "Modelação do escoamento e da transferência de massa na ultrafiltração de soluções aquosas de lisozima e sal", Proceedings of "Congresso de Métodos Computacionais em Engenharia-CMCE", Lisboa, Portugal, 31 Maio-2 Junho, 2004.

Pinto, I., Queiroz, D.P., Gulomar, J., Gil, M.H., De Pinho, M.N., "Evaluation of the Permeability and Hemocompatibility of Polyurethanes with Two Soft Segments", BioÉvora 2004, Évora, Portugal, 9 a 11 de setembro de 2004.

D - Meetings organization

Co-Organization of "Jornadas Temáticas do ICEMS: Materiais e Tecnologias para Aplicações Biomédicas", I.S.T., Lisboa, 18 - 19 October 2004

E - Advanced training

- PhD Thesis

Arlindo Carriço Gomes, "Estudo de um Bioreactor de Membranas no Tratamento de Efluentes Industriais". Co-supervision of Prof^a Maria Norberta de Pinho. Supervision - Prof^a Isolina Cabral (Universidade da Beira Interior). Thesis concluded and submitted in November 2004.

Ana Rita Gonçalves da Costa, "Mecanismos de Colmatação Coloidal em Ultrafiltração e Nanofiltração de Matéria Orgânica Natural de Águas de Superfície". Supervisor - Prof^a Maria Norberta de Pinho. Started in June 2002.

Vitor Magueijo, "Dinâmica de Fluidos Computacional e Transferência de Massa em Ultrafiltração de Proteínas". Supervisor - Prof. Maria Norberta de Pinho, Co-supervisor - Prof. Viriato Semão. Started in January 2002.

Ana Mourão, "Estudo e optimização de um processo integrado de membranas para o isolamento de um inibidor das β -Lactamases". Supervisor - Prof. Ana Maria Alves. Started in 2004.

Maria do rosário Ribeiro, supervision of:

-Joana Luís Refoios Tudela (Synthesis of modified polyolefins via copolymerisation with polar monomers) - On going

-João Miguel Dordio Campos (Development of supported catalysts for the olefin polymerization) - On going

Title: Hydride electrode alloys for PEM fuel cells

Student: Yun Chen

Supervisor: C.A.C. Sequeira

Submitted on December 2004

Title: Electrochemistry of Prussian Blue in aqueous systems

Student: Luís Filipe Frechaut Tropa Torres Gonçalves

Supervisor: C.A.C. Sequeira

Expected date of submission: June 2005

Title: Polymer fuel cells for electric vehicles

Student: Rui Pedro da Costa Neto

Supervisor: C.A.C. Sequeira

Expected date of submission: July 2005

Title: PEO-M Salts based electrolytes for primary cells

Student: Maria João Plancha Carrilho

Supervisor: C.A.C. Sequeira

Expected date of submission: September 2005

- Master Thesis

Nuno Pereira, "Dessalinização de Água do Mar por Osmose Inversa", Mestrado de Hidráulica (IST/DEC). Supervisor - Prof^a Maria Norberta de Pinho, Co-supervisor Prof. Vítor Geraldes. Conclusion in February 2004.

- Other (Advanced Training)

Research Scholarship UTL/IST/ISA - Isabel Catarino 2004/2005

J - Patents

Patent - "Integrated nanofiltration process to reduce the alcohol content of alcoholic beverages", Quinta de Pancas/IST, Maria Norberta de Pinho, Fernando Gonçalves (inventors), International Patent PCT/PT04/000014 (2004)

Others

Member of NanoHemPro "Expanding membrane macroscale applications by exploring nanoscale material properties" - Contract nº 500623-2. "Network of Excellence" - "Sixth Framework Programme", Priority 3 - Nano-technologies and nano-sciences, knowledge-based multifunctional materials, and new production processes and devices - "NMP"

"Projecto de Reequipamento" - "Network of laboratories of functional materials for reactions, membrane processes and fuel cells", Coordinated by Prof. Maria Norberta de Pinho. Equipment for flow and mass transfer characterization (PIV, HI) and membrane characterization (EKA).


GRECAT is member of the EU - funded Coordination Action of Nanostructured Catalytic Oxide Research and Development in Europe (CONCORDE) approved and contracted in 2004.

Cooperation with other Portuguese institutions and at international level was maintained during the 2004 period, as it has been done before (see Research Report for 2002).

Data: quarta-feira, 30 de Março de 2005


(assinatura do Responsável pelo Projecto)

30-03-2005 - 15:47

 UNIÃO EUROPEIA - Fundos Estruturais

 Governo da República Portuguesa


Ciência, Inovação 2010 Programa Operacional Ciência e Inovação 2010
MINISTÉRIO DA CIÊNCIA E DO ENSINO SUPERIOR



Instituto de Ciência e Engenharia de Materiais e Superfícies (Lisboa) - ICEMS [84]

[[Página principal](#) > [Relatório científico 2004](#)]**Sub-projecto****Sub-project**

Preparation and characterisation of multifunctional surfaces and thin films

Investigador responsável**Project leader**

Rui Mario Correia Silva Vilar

Resumo da actividade desenvolvida

The research in surfaces and interfaces will cover in three main areas: (i) functional thin films; (ii) surface modification; (iii) interfaces.

(i) Functional thin films

The activities in this area concerned mainly the production and characterisation of thin films for spin electronics, nanophotonics and integrated optics as well as of GaN films for optoelectronic applications.

In what concerns thin films for spin electronics, ferromagnetic Fe₃O₄ and CrO₂ films were deposited by PLD (pulsed laser deposition) and LCVD (laser chemical vapour deposition). The films were characterised by X-ray diffraction, conversion electron Mössbauer spectroscopy (CEMS) and AFM, and their magnetic and transport properties investigated by extraction magnetometry and resistivity measurements. PLD has also been used to prepare GaN thin films. Results from photoluminescence decay and transient photocurrents were compared with respect to trapping, recombination, and transport of photo-generated carriers in polycrystalline GaN thin films.

The degradation of a-Si:H based p-i-n detectors when subjected to a 1.5 MeV He⁴ beam was studied by photoconductivity measurements.

Research on nanophotonics and integrated optics materials and thin films concerned tellurides based on TeO₂-ZnO-ZnCl₂ prepared by conventional melting and casting and silicate glass planar waveguides prepared by sol-gel processing. These materials were studied using X-ray diffraction, infrared and Raman spectrometry, visible and m-line spectroscopy, ellipsometry, photoluminescence spectroscopy and Rutherford backscattering spectroscopy, as well as measurements of relevant optical properties. One and 3D photonic band gap structures were also prepared and studied.

Lorentz microscopy is being combined with transmission electron microscopy to image magnetic domains and microstructural features of permanent magnetic intermetallic compounds of the systems U (Fe, M) with M = Si, Al. The magnetic properties of intermetallics, as well as those of transition metals multilayers are being studied by Mössbauer spectrometry and magnetoresistance measurements.

(ii) Surface modification

The application of the Scanning Probe Microscope (SPM) to modify and characterise surfaces has been studied. In what concerns surface modification, work during 2004 has continued in the preparation of a 2D nanopatterned surfaces and patterning of self-assembled silicon nanocrystals using the SPM tip. SPM has also been used to study the tribological behaviour of clean metallic surfaces at the nanoscale. In particular, a nanoscratch testing method has been developed to study abrasion phenomena and mathematical methods to deconvolute the experimental surface profile from the tip profile were proposed.

Laser powder deposition has been applied to epitaxial single crystal growth using MCrAlX-type alloys and a Ni-4.8Co-8.5Cr-5.3Al-2.65Ta-2.05Ti-9.25W-0.5Mo (wt.%) superalloy. The crystal mosaicity, lattice mismatch and structure misorientation were studied by plotting Reciprocal Space X-ray diffraction Maps (RSM) and Rutherford backscattering. Applications sought are single crystal turbine blade production and repair. The same method is being applied to aluminium-based metal matrix composites for rapid tooling applications and to the microdeposition of titanium alloys for dental prosthesis manufacturing.

The surface modification of aluminium alloys by laser cladding with Al-TM (TM=Cr, Mo and Nb) alloys and Cu-matrix nanocomposites with enhanced surface hardness and wear resistance is being studied for rapid tooling applications. Variable powder feed rate laser cladding is being used as a combinatorial synthetic method in the design of materials for several applications, in particular rapid tooling and metallic biomaterials for dental applications. Laser microtexturing is being used to create controlled surface textures capable of providing unusual surface properties (adhesion, wettability, biointegration, drug release ability, etc.).

The development of environmentally friendly technologies for temporary protection of aluminium alloys and coil coated galvanized steel using inorganic-organic hybrid films based on doped and nanostructured silanes prepared both by immersion and sol-gel processing has been investigated. The development of self-healing coatings is especially envisaged. Attention is also devoted to the corrosion behaviour of formed parts and cut edges of coil coated substrates. Fundamental studies on the passivity of metals and alloys and on the semiconducting properties of the passive films, in conjunction with chemical properties have also been carried out. For all these studies the use of techniques such as SVET, Scanning Kelvin Probe, Electrochemical Impedance spectroscopy, SEM, TEM, AES/XPS were of paramount importance.

(iii) Interfaces

The focus of research in interfaces has been placed in systems where metal/ceramic or ceramic/ceramic interfaces play a key role: the study of new production routes for tougher ceramic and metal matrix composites, the relations between interface properties, production opportunities and properties is the aim of the carried out research.

Indicadores de execução 2004**A - Publicações**

Livros

Previsto**Realizado**

1

7

Artigos em revistas internacionais

40

45

Artigos em revistas nacionais

2

5

B - Comunicações

Em congressos científicos internacionais

26

41

Em congressos científicos nacionais

5

14

C - Relatórios

0

10

D - Organização de seminários e conferências

1

11

E - Formação Avançada

Teses de Doutoramento	2	1
Teses de Mestrado	2	4
Outra	0	0
F - Modelos	0	0
G - Aplicações computacionais	0	0
H - Instalações Piloto	0	0
I - Protótipos laboratoriais	0	0
J - Patentes	0	0

Publicações em 2004

A - Publications

- Books and chapters of books

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Neiva Correia, M.J., Fernandes, J.C.S., "Corrosão Metálica", in "Nova Activa Multimédia", LexiCultural Ed., 2004.

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Neiva Correia, M.J., Fernandes, J.C.S., "O Papel", in "Nova Activa Multimédia", LexiCultural Ed., 2004.

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B - Communications

- In international meetings

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Rangel, C.M., Luz, P.P., Correia, F., Palva, T.I., Montemor, M.F., Mauricio, A., Figueiredo, C., Ferreira, M.G.S., Aires Barros, L., Thompson, G.E., "Water Transport processes in Highly Porous Calcareous Stone Using dc and ac Electrochemical Techniques", presented at the 6th International Symposium on the Conservation of Monuments in the Mediterranean Basin, Lisbon, Portugal, April, 2004.

Montemor, M.F., Triki, E., Trabelsi, W., Dhoubi, L.; Ferreira, M.G.S.; "The use of electrochemical and analytical techniques to assess the corrosion behaviour of galvanised steel pre-treated with organosilanes", presented at the European Corrosion Congress - EUROCORR 2004, Nice, France, September, 2004.

Ferreira, M.G.S., Cabral, A., Montemor, M.F., "The use of BTEPT Films as Chromate Substitutes for Pre-treatments on AA2024-T3", presented at the European Corrosion Congress - EUROCORR 2004, Nice, France, September, 2004.

Montemor, M.F., "Auger spectroscopy and X-ray photoelectron spectroscopy applied in corrosion research", Invited paper presented at the "Application of Modern Instrumental Methods in Corrosion research and Quality Assessment", Warsaw, Polónia, October, 2004.

Bastos, A.C., Ferreira, M.G.S., Simões, A.M., "Inibição da Corrosão por Cromato e Fosfato de Zinco em substratos de Ferro e Zinco. E. do Electroquímico" presented at the XVI Congresso da Sociedade Ibero-Americana de Electroquímica (SIBAE 2004), San José, Costa Rica, February, 2004.

Picciochi, R., Fernandes, J.C.S., Moura e Silva, T., Cunha Belo, M., Ferreira, M.G.S., "Estudos de Fotoelectroquímica e Capacidade em Filmes de Óxido de Alumínio", presented at the "XVI Congresso da Sociedade Ibero-Americana de Electroquímica", San José, Costa Rica, February, 2004.

Picciochi, R., Fernandes, J.C.S., Ferreira, M.G.S., Ferreira, J.B., Fonseca, I.T.E., "Estudo de Processos de Anodização Não-Poluentes para Alumínio 2024", presented at the "XVI Congresso da Sociedade Ibero-Americana de Electroquímica", San José, Costa Rica, February, 2004.

Morão, A. I. C., Alves, A. M. B., Afonso, M. D., Fernandes, J. C. S., "Zeta Potential of NF Membranes: Influence of Solution Composition and Membrane State", presented at "Euromembrane 2004", Hamburg, Germany, September, 2004.

Fernandes, J.C.S., Picciochi, R., Moura e Silva, T., Ferreira, M.G.S., Fonseca, I.T.E., "Studies on Sulphuric-Boric Acid Anodising Processes for Aluminium and 2024 Aluminium Alloy", presented at the "European Corrosion Congress - Eurocorr 2004", Nice, France, September, 2004.

Popovici, N., Sousa, P.M., Paramês, M.L., Silvestre, A.J., Axelsson, A.K., Alford, N.McN. and Conde, O., "Pulsed laser deposition of TiO₂ and Co-doped TiO₂ thin films", European Mater. Res. Soc. Spring Meeting, EMRS'04, Symposium N, Strasbourg (F), 2004.

Paramês, M.L., Mariano, J., Popovici, N., Rogalski, M.S. and Conde, O., "UV Pulsed laser deposition of magnetite thin films", European Mater. Res. Soc. Spring Meeting, EMRS'04, Symposium D, Strasbourg (F), 2004.

Sousa, P.M., Silvestre, A.J., Popovici, N. and Conde, O., "Morphological and structural characterization of CrO₂/Cr₂O₃ films grown by Laser-CVD", European Mater. Res. Soc. Spring Meeting, EMRS'04, Symposium N, Strasbourg (F), 2004.

Silvestre, A.J., Sousa, P.M., Popovici, N. and Conde, O., "CrO₂/Cr₂O₃ biphasic films obtained from KrF laser photodissociation of Cr(CO)₆", 4th Intern. Conf. on Photoexcited Processes and Applications, ICPEPA'04, Lecce (I), 2004.

Conde, O., "Laser deposition of magnetic oxides", 4th Intern. Conf. on Photoexcited Processes and Applications, ICPEPA'04, Lecce (I), 2004.

Popovici, N., Sousa, P.M., Silva, R.C., Paramês, M.L., Silvestre, A.J., Axelsson, A.K., Alford, N. McN and Conde, O., "TiO₂ and Co-doped TiO₂ thin films grown by pulsed laser deposition", 4th Intern. Conf. on Photoexcited Processes and Applications, ICPEPA'04, Lecce (I), 2004.

Dias, D., Carvalho, P., Ferro, A. C., Lohwasser, W., "Influence of MnO₂ crystal structure on ESR of tantalum capacitors", Junior Euromat 4, Lausanne, Suíça, September, 2004.

- In national meetings

Costa, L., Vilar, R., Reti, T., "Modelling of phase transformations in steel parts built by laser powder deposition", RPD 2004 - Rapid Product Development Event "Agile Development for Productivity", Centimfe, Marinha Grande, 12 and 13 October 2004.

Vilar, R., Sequeira, A. D., Ferreira, P. N., Silva, R. C., "Multilayer Single Crystal Coatings on Superalloys", RPD 2004 Rapid Product Development Event "Agile Development for Productivity", Centimfe, Marinha Grande, 12 and 13 October 2004.

Vilar, R., "Laser-Assisted Combinatorial Materials Design", RPD 2004 Rapid Product Development Event "Agile Development for Productivity", Centimfe, Marinha Grande, 12 and 13 October 2004.

Matos, A. P. Alves de, Lopes, M.T., Carvalho, P. A., Vilar, R., Leitão, J., "A SEM-EDS Study of particulate matter trapped inside the marine sponge Erylus discophorus", Encontro da Sociedade Portuguesa de Microscopia Electrónica, Universidade de Aveiro, November, 2004.

Fonseca, I., Marques, M.T., Correia, J.B., Carvalho, P.A., Vilar, R., "Characterization of copper-iron carbide nanocomposite produced via mechanical alloying", Internacional Workshop on Nanomaterials, organized by ICEMS, IST, Lisbon, 25 February, 2004.

Fonseca, I., Marques, M.T., Correia, J.B., Carvalho, P.A., Vilar, R., "Characterization of nanoprecipitates in a copper matrix", Dia dos Materiais, Sociedade Portuguesa de Materiais, Universidade do Porto (SPM Award), 3 November, 2004.

Graça, S., Colaço, R., Vilar, R., Gnecco, E., Meyer, E., "Tribology of Ni-Co alloys: from micro to nanoscale", Dia dos Materiais, Sociedade Portuguesa de Materiais, Universidade do Porto, 3 November, 2004.

Fernandes, A., Lavrov, A., Utkin, A., Vilar, R., "LIDAR: uma Nova Técnica de Detecção de Incêndios Florestais", Livro de Resumos de 8ª Conferência Nacional de Ambiente, Lisboa, Portugal, pp.185-186, 2004.

Lavrov, A., Utkin, A.B., Fernandes, A., Vilar, R., "Estimativa da Concentração do fumo de Incêndios Florestais Baseada em Modelação Numérica e Medições Lidar", Livro de Resumos de 8ª Conferência Nacional de Ambiente, Lisboa, Portugal, pp. 376-377, 2004.

Matos, J., Montemor, M.F., Fernandes, J.C.S., Lourenço, Z., Costa, A., Appleton, J. Ferreira, M.G.S., Simões, A.M.P., "Desenvolvimento e Teste de uma Sonda Múltipla de Cloretos para Utilização em Estruturas de Betão Armado", presented at the "4as Jornadas da Revista Corrosão e Protecção de Materiais", Lisboa, Novembro, 2004.

Moura e Silva, T. and Ferreira, M.G.S. "Materiais para Electrodo Neuroestimuladores" apresentado nas Jornadas Temáticas do ICEMS - Materiais e Tecnologias para Aplicações Biomédicas", Lisboa, 18-19 Outubro, 2004.

Zheludkevich, M.L., Serra R., Miranda, Salvado I.M., Ferreira, M.G.S.; "Pitting Corrosion of Sol-Gel Coated AA2024-T3 in Chloride Solutions", XXXIX Reunião da SPME-BC, 4 a 6 de Novembro, Aveiro, Portugal.

Serra, R., Zheludkevich, M.L., Ferreira, M.G.S., "Stability of Plasma Polymer Films Applied on Polyurethane Coil Coatings", XXXIX Reunião da SPME-BC, 4 a 6 de Novembro, Aveiro, Portugal.

Serra, R., Zheludkevich, M.L., Montemor, Ferreira, M.G.S., "Estudo das propriedades Estruturais e de Protecção Contra a Corrosão de revestimentos Nanoestruturados Híbridos Derivados de Sol-Gel para o Alumínio AA2024-T3, Presented at the "4as Jornadas da Revista Corrosão e Protecção de Materiais", Lisboa, Novembro, 2004.

C - Technical reports

Fagerholm, H., Rosqvist, A., Peltola, A., Hornstrom, S.E., Bergman, T., Albers, A., Lewus, M., Ferreira, M.G.S., Montemor, M.F., ECSC Steel RTD Program "Multifunctional passivation methods for hot dip galvanised steel" (project nº ECSC 7210-PR382) Technical report nº 4, Junho de 2004.

Montemor, M.F., NATO SCIENCE PROGRAMME Cooperative Science and Technology Sub-Programme, Collaborative Linkage Grant Ref. PST. CLG.979427, Relatório Final, Dezembro de 2004.

Interim Technical Report Nº 2 (July 1st 2003 - December 31st 2003) of the EU Project Nº NNE5-2001-402, "Adaptation of a new energy- and timesaving hard anodising process for different Al-alloys and tests in selected European industrial applications", January 2004.

Interim Technical Report Nº 3 (January 1st 2004 - June 30th 2004) of the EU Project Nº NNE5-2001-402, "Adaptation of a new energy- and timesaving hard anodising process for different Al-alloys and tests in selected European industrial applications", July 2004.

Picciochi, R., Pereira, A.M., Fernandes, J.C.S., Fonseca, I.T., Progress Report of the Project POCTI/CTM/39846/01, "Avaliação Laboratorial e In-Situ da Durabilidade de Alumínios Anodizados por Tecnologias Limpas", October 2004.

Duarte, R., Castela, A.S., Ferreira, M.G.S., "Prediction of Durability Performance of Coil-Coated Steel used in the Building Industry of Climatic Parameters on Corrosion Properties of Coil-Coated Materials", ECSC project nº 7210-PR321, July 2004.

Grundmeier, G., Yang L., Saeman N., Strauss B., Linder B., Valle R., English T., Hammond D., Ferreira M.G.S., Zheludkevich M.L., ECSC Steel RTD Program "Tailored Thin Plasma Polymers for Surface Engineering of Coil Coated Steel" (project nº ECSC 7210-PR/383) Technical report nº 3, February 2004.

Grundmeier, G., Yang, L., Saeman, N., Strauss, B., Linder, B., Valle, R., English, T., Hammond, D., Ferreira, M.G.S., Zheludkevich, M.L., ECSC Steel RTD Program "Tailored Thin Plasma Polymers for Surface Engineering of Coil Coated Steel" (project nº ECSC 7210-PR/383) Technical report nº 4, September 2004.

2nd Year Progress Report of POCTI/CTM/41413/2001 Project "Laser-driven synthesis of ferromagnetic oxides for spin electronics".

3rd Year Progress Report of E.U. GROWTH Project FENIKS: "Ferromagnetic semiconductors and novel magnetic-semiconductor heterostructures for improved knowledge on spintronics" (contract no. G5RD-CT-2001-00535).

D - Meetings organization

3rd European Science Foundation Nanotribology Workshop, 18 - 22 September 2004, Sesimbra - Portugal (Organizing Committee: R. Colaço, R. Vilar and Ernst Meyer).

VRAP2005 International Conference on Advanced Research in Virtual and Rapid Prototyping, Leiria, Outubro de 2005, (R. Vilar: member of The Conference Scientific Committee).

Materiais e Tecnologias para Aplicações Biomédicas, Jornadas Temáticas do ICEMS, Centro de Congressos do IST, 18 e 19 de Outubro de 2004 (Organizing Committee: R. Vilar, N. Reis and M. N. Pinho).

R.M. Almeida was involved in the organization (International Organizing Committee or Advisory Committee) of the following international meetings:

5th Symposium on SiO₂, Advanced Dielectrics and Related devices, Chamonix (France), June 21-23, 2004.

9th International Conference on the Structure of Non-Crystalline Materials, Coming (New York, USA), July 11-15, 2004.

Members of the Local Organizing Committee of the "European Corrosion Congress - EUROCORR 2005", to be held in Lisbon, Portugal

(September 2005)

Ferreira M.G.S. (Chairman)

Montemor M.F.

Fernandes J.C.S.

Simões A.M.P.

Carmezim M.J.

Moura e Silva M.T.

Cunha Belo M.

Castela A.L. S.

Ferreira, M.G.S., Member of the scientific board of the 6th European Symposium on Electrochemical Engineering, Thessalonik, Greece, 2004.

Ferreira, M.G.S., Member of the Local Organizing Committee of the 4as Jornadas da Revista Corrosão e Protecção de Materiais", Lisboa Novembro 2004.

Simões, A.M., Member of the Local Organizing Committee of the 4as Jornadas da Revista Corrosão e Protecção de Materiais", Lisboa Novembro 2004.

Olinda Conde was a member of the scientific committee of 4th Intern. Conf. on Photoexcited Processes and Applications, ICPEPA'04, Lecce (I), Sept. 5 - 12, 2004, and co-chaired one of the conference sessions.

E - Advanced Training

- PhD Thesis

Augusto Moita de Deus, A thermal and mechanical model of laser cladding, University of Illinois at Urbana-Champaign, 2004 (discussed and approved) (Supervisor: J. Mazumder).

Amélia Almeida, Desenvolvimento de ligas alumínio-metal de transição: produção, microestrutura e propriedades, Instituto Superior Técnico (Ongoing - to be concluded in 2005) (Supervisor: R. Vilar).

José Lino da Costa, Aplicação da deposição assistida por laser ao fabrico de protótipos, Instituto Superior Técnico (Ongoing - to be concluded in 2005) (Supervisor: R. Vilar).

Armando Fernandes, Detecção de incêndios florestais por retrodifusão de radiação laser, Instituto Superior Técnico (Ongoing - to be concluded in 2005) (Supervisor: R. Vilar).

Manickam Sivakumar, Laser Surface Processing for Odontological Applications, Instituto Superior Técnico (Ongoing - started in June 2002) (Supervisor: R. Vilar).

Maria Teresa Marques, Estrutura - propriedades de nanocompósitos à base de cobre produzidos por mecanosíntese, Instituto Superior Técnico (em co-orientação com o Dr. José Brito Correia, do INETI) (Ongoing - started in June 2002) (Supervisor: R. Vilar).

Christopher Meacock, Laser-Assisted Design of Titanium Alloys for Dental Prosthesis, Instituto Superior Técnico (Ongoing - started in March 2004) (Supervisor: R. Vilar).

R. Anand Kumar, Rapid Tooling by Laser Powder Deposition of Aluminium Matrix Composites, Instituto Superior Técnico (Ongoing - started in June 2004) (Supervisor: R. Vilar).

António Sérgio Crespo, Aplicação da deposição assistida por laser à manufactura de próteses e implantes metálicos, Instituto Superior Técnico (Ongoing - started in September 2004) (Supervisor: R. Vilar).

Sérgio Graça, Tribology of Ni-Co alloys: from micro to nanoscale, Instituto Superior Técnico (Ongoing - Started in October 2004) (Supervisor: R. Colaço).

J. F. M. L. Mariano, Ressonância Nuclear em Filmes Finos Magnéticos (Ongoing - Started in July 2004) (Supervisor: M. S. Rogalski).

Raquel Alexandra Galamba Duarte, em curso, Supervisor: Ferreira M.G.S.

António Alexandre da Cunha Bastos, em curso, Supervisor: Simões A.M.P.

Ana Maria Mateus Cabral, em curso, Supervisor: Ferreira M.G.S.

Ricardo Gil Henriques Serra, em curso, Supervisor: Ferreira M.G.S.

Kiryl Yasakau, em curso, Supervisor: Ferreira M.G.S.

Pedro M. Sousa: "Síntese de filmes finos de óxido de crómio por LCVD (Laser-assisted Chemical Vapour Deposition) e caracterização" - FCUL (ongoing)

Nicoleta Popovici: "Filmes finos de óxidos funcionais para aplicações em spintrónica. Crescimento e caracterização" - FCUL (ongoing)

Décio Dias - Tantalum Capacitors with low ESR values
Supervisor A.C. Ferro (started December 2001)

Ana Mafalda Guedes - Novel Reaction Infiltration Process for Aluminium Alloy Matrix Composites
Supervisor A.C. Ferro (started September 2002)

Pedro Sanguino (on going)

Manfred Niehus (on going)

- Master Thesis

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Isabel Nogueira, Microscopia Electrónica de Transmissão e Simulação de Imagem - Estudo de defeitos planares no composto intermetálico Co3W, Faculdade de Ciências da Universidade de Lisboa, 2004 (discussed and approved) (Supervisor: R. Vilar).

Sónia Eugénio, Modificação Superficial de Dentina por Tratamento com Laser de Excímero, Instituto Superior Técnico, 2004 (discussed and approved) (Supervisor: R. Vilar).

Maria José Vinagre, Alterações cromáticas induzidas em pigmentos antigos e actuais por tratamento com lasers de excímeros, Instituto Superior Técnico, (ongoing - to be concluded in 2005) (Supervisor: R. Vilar).

Henrique António Silva, Energia no Ensino da Física, Universidade do Algarve (concluída - 22/07/2004) (Supervisor: M. S. Rogalski).

Ángela Maria Pereira Machado - Influence of the type of Cement on the resistance of Concrete to sulfate attack, (Concluded 21-06-2004) Supervisor A.C. Simões Ribeiro - LNEC. Co-Supervisor A.C. Ferro

Ilda Leonor Narciso - Fabrication of Materials with controlled architecture, Supervisor A.C. Ferro, (started September 2002)

Others

R.M. Almeida is a member of the Advisory Editorial Boards of: Journal of Non-Crystalline Solids, Journal of Sol-Gel Science and Technology and Key Engineering Materials.

R.M. Almeida was a Session Chair in 2 international conferences in 2004.

R.M. Almeida was an Invited Professor at the Department of Physics/CeFSA, University of Trento (Italy), from January 5-18, doing collaborative photonic materials research with the group of Dr. Maurizio Ferrari and Prof. Maurizio Montagna.

R.M. Almeida was an Invited Professor at the Materials Science and Engineering Department, Lehigh University (PA, USA), since November 15, doing glass research in the group of Prof. Himanshu Jain and teaching the graduate course "Optical and Photonic Glasses" during the Spring semester of 2005.

R.M. Almeida was a recipient of the Award Stimulus to Excellence ("Estímulo à Excelência"), given by FCT for a period of two years, as a reward for having published over 100 papers in international scientific journals included in ISI's Science Citation Index, with over 500 hundred citations by independent publications.

Fernandes J. C. S., Member of the International Advisory Board of the "Centre of Competence in Integrated Technical and Quality Systems for Corrosion Protection", Warsaw, Poland.

Fernandes, J.C.S., On-line Seminar "Application of EIS to Corrosion Studies in Aluminium", e-School of the European Internet Centre for Impedance Spectroscopy - EICIS (<http://accessimpedance.iusi.bas.bg>), 2004

Fernandes J.C.S.: Lecturer of the master course on "Electroquímica Aplicada 2003-2004 - Especialização em Corrosão e Protecção de Materiais", organised by the Faculdade de Ciências da Universidade de Lisboa, in the topics of "Electrochemical Noise - Ruído Electroquímico", integrated in the subject of Corrosion Monitoring and Control, and "Metallic Coatings and Anodising - Revestimentos Metálicos e Anodizações", integrated in the subject of Protection Methods.

Fernandes J.C.S.: Lecturer of the seminar on "Protecção Catódica - Uma Ferramenta Contra a Corrosão", held at Escola Superior de Tecnologia do Barreiro, December 2004

Montemor M.F.: Lecturer of the master course on "Electroquímica Aplicada 2003-2004 - Especialização em Corrosão e Protecção de Materiais", organised by the Faculdade de Ciências da Universidade de Lisboa, in the topics of "Técnicas de XPS e Auger", integrated in the subject of Structure and Surface Characterisation

Montemor M.F.: Member of the Technical Group TGS nº 5 "Finishing and Coating" for the Monitoring of R&D projects of the Research Fund for Coal and Steel (RFCS) and for the running projects of the European Community for Coal and Steel (ECSC) - European Commission, RESEARCH DIRECTORATE-GENERAL, Direction G - Industrial Technologies

Montemor, M.F. - Member of the Editorial Board of the Journal:

- Cement and Concrete Composites, pub Elsevier.

Ferreira, M.G.S. - Member of the Editorial Board of the Journals:

- Materials and Corrosion/Werkstoffe und Korrosion.
- Journal of Corrosion Science & Engineering
- Corrosion Reviews
- Revista de Corrosão e Protecção dos Materiais
- Portugaliae Electrochimica Acta
- Journal of the Corrosion Science Society of Korea

Computer Program:

GAMGI, General Atomistic Modelling Graphic Interface,

Most recent release: GAMGI 0.10.7

Website: <http://www.gamgi.org/>

GAMGI Website: <http://www.gamgi.org/>

Scientific spreading and Promotion of Education through Scientific Experimentation

Explora os Materiais 2004 (Exploring Materials 2004)

Co-ordination of the one Month open Laboratory and Materials exhibition for high school and undergraduate students.

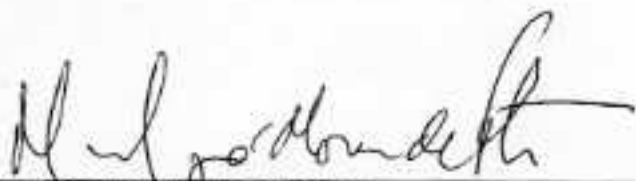
Visitants/explorers: 2100 high school students and 130 teachers from 52 high school and around 400 undergraduate students and 95 lecturers and professors from IST.

Vamos Brincar aos Materiais (Lets play with Materials)

Program for the promotion of Education via Materials Scientific Experimentation Activities in primary schools.

Participants: 60 schools, 350 teachers, 5000 children.

Data: quarta-feira, 30 de Março de 2005



(assinatura do Responsável pelo Projecto)

30-03-2005 - 15:45

 UNIÃO EUROPEIA - Fundos Estruturais

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